

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BOARD OF PATENT APPEALS AND INTERFERENCES

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In re Application of:	:	Examiner: Kaj Olsen
	:	
Gerd SCHEYING et al.	:	
	:	
For: POTENTIOMETRIC SENSING	:	
DEVICE	:	
	:	Art Unit: 1795
Filed: April 15, 2004	:	Confirmation No.: 8673
	:	
Serial No.: 10/825,571	:	
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Signature: /Kevin Kambo/  
 Kevin Kambo

**APPEAL BRIEF PURSUANT TO 37 C.F.R. § 41.37**

SIR:

On March 25, 2010, Appellants submitted a Notice of Appeal from the last decision of the Examiner contained in the Final Office Action dated November 2, 2009 in the above-identified patent application.

In accordance with 37 C.F.R. § 41.37, this brief is submitted in support of the appeal of the rejections of claims 1 to 20. For at least the reasons set forth below, the final rejections of claims 1 to 20 should be reversed.

**1. REAL PARTY IN INTEREST**

The real party in interest in the present appeal is ROBERT BOSCH GMBH of Stuttgart in the Federal Republic of Germany, which is the assignee of the entire right, title and interest in and to the present application.

**2. RELATED APPEALS AND INTERFERENCES**

There are no other prior or pending appeals, interferences or judicial proceedings known by the undersigned, or believed by the undersigned to be known to Appellants or the assignee, ROBERT BOSCH GMBH, “which may be related to, directly

affect or be directly affected by or have a bearing on the Board's decision in the pending appeal."

### **3. STATUS OF CLAIMS**

Claims 1 to 20 are pending.

Claim 1 to 3 stand rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of U.S. Patent Application Publication No. 2001/0005137 ("Horie '137"), U.S. Patent Application Publication No. 2002/0113596 ("Horie '596"), and U.S. Patent No. 5,250,168 ("Tsukada et al.").

Claims 4 to 6 stand rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Horie '137, Horie '596, Tsukada et al., and U.S. Patent No. 5,904,987 ("Tani et al.").

Claims 7 and 8 stand rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Horie '137, Horie '596, Tsukada et al., Tani et al., U.S. Patent No. 5,320,735 ("Kato et al."), and U.S. Patent No. 5,126,034 ("Carter et al.").

Claims 9 to 13 stand rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Horie '137, Horie '596, Tsukada et al., and U.S. Patent No. 3,843,400 ("Radford et al.").

Claims 14 to 19 stand rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Horie '137, Horie '596, Tsukada et al., Tani et al., U.S. Patent No. 4,582,589 ("Ushizawa et al.") and U.S. Patent No. 5,522,980 ("Hobbs et al.").

Claim 20 stands rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Horie '137, Horie '596, Tsukada et al., and U.S. Patent No. 1,956,741 ("Hornberger").

A copy of the appealed claims, *i.e.*, claims 1 to 20, is attached hereto in the Claims Appendix.

### **4. STATUS OF AMENDMENTS**

In response to the Final Office Action dated November 2, 2009, Appellants submitted a "Reply Under 37 C.F.R. § 1.116" on February 1, 2010. The Reply Under 37 C.F.R. § 1.116 did not include any proposed amendments to the claims. It is noted, however, that the Advisory Action dated February 18, 2010 indicates that "[f]or purposes of appeal, the proposed amendment(s) . . . will be entered and an explanation of how the new or amended claims would be rejected is provided below or appended," despite the fact that no proposed

amendments to the claims were included in the Reply Under 37 C.F.R. § 1.116. It is Appellants' understanding that the claims as included in the annexed "Claims Appendix" reflect the current claims.

**5. SUMMARY OF CLAIMED SUBJECT MATTER**

The claims on appeal include one independent claim, *i.e.*, claim 1.

Independent claim 1 relates to a potentiometric sensor device 1 for measuring pH value. *Specification* at page 3, lines 3 to 8. Claim 1 recites that the device 1 includes a substrate 3. *Specification* at page 3, lines 13 to 15. Claim 1 recites that the device includes two electrodes 4, 5 positioned on the substrate 3, wherein the two electrodes 4, 5 are applied with the aid of thick film technology, and wherein the two electrodes 4, 5 form an interdigital comb structure 6. *Specification* at page 3, lines 24 to 26. Claim 1 recites that the device 1 includes an evaluation circuit 2 disposed on the substrate 3 and in communication with the electrodes 4, 5, the evaluation circuit 2 configured to detect a degradation process of a motor oil based on the potentiometric response of the two electrodes 4, 5. *Specification* at page 3, lines 3 to 8, page 9, lines 25 to 30, and page 10, line 31 to page 11, line 7.

**6. GROUND OF REJECTION TO BE REVIEWED ON APPEAL**

- A. Whether claims 1 to 3 are patentable under 35 U.S.C. § 103(a) over the combination of Horie '137, Horie '596, and Tsukada et al.
- B. Whether claims 4 to 6 are patentable under 35 U.S.C. § 103(a) over the combination of Horie '137, Horie '596, Tsukada et al., and Tani et al.
- C. Whether claims 7 and 8 are patentable under 35 U.S.C. § 103(a) over the combination of Horie '137, Horie '596, Tsukada et al., Tani et al., Kato et al., and Carter et al.
- D. Whether claims 9 to 13 are patentable under 35 U.S.C. § 103(a) over the combination of Horie '137, Horie '596, Tsukada et al., and Radford et al.
- E. Whether claims 14 to 19 are patentable under 35 U.S.C. § 103(a) over the combination of Horie '137, Horie '596, Tsukada et al., Tani et al., Ushizawa et al., and Hobbs et al.
- F. Whether claim 20 is patentable under 35 U.S.C. § 103(a) over the combination of Horie '137, Horie '596, Tsukada et al., and Hornberger.

7. **ARGUMENT**

A. **Rejection of Claims 1 to 3 Under 35 U.S.C. § 103(a)**

Claims 1 to 3 stand rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Horie '137, Horie '596, and Tsukada et al. It is respectfully submitted that the present rejection should be reversed for at least the following reasons.

Claim 1 recites, *inter alia*, an evaluation circuit disposed on the substrate and in communication with the electrodes, the evaluation circuit configured to detect a degradation process of a motor oil based on the potentiometric response of the two electrodes.

The Examiner contends at pages 2 to 3 of the Final Office Action that the proposed combination of Horie '137, Horie '596, and Tsukada et al. would lead to a sensor device having all of the features of claim 1. In particular, the Examiner asserts that

[b]ecause Horie '596 already recognized that the circuitry 381 for the oil sensor can be located adjacent to the actual oil sensor (fig. 34 and par. 0174), it would have been obvious . . . to also utilize the substrate of Horie '137 that the electrodes were mounted to as a location for the evaluation circuit, as suggested by Tsukada, in order to facilitate the device integration and to minimize the number of substrates needed for the sensor."

Final Office Action at page 3. Applicants respectfully disagree for at least the following reasons.

Referring to Tsukada et al., the Examiner asserts that "Tsukada teaches in an alternate ion sensor that the sensor circuitry 17 (i.e., evaluation circuit) can be disposed on the same substrate as the electrodes for the sensor probe." Final Office Action at page 3.

Referring to the sensor circuitry 17, Tsukada et al. makes clear that this circuitry 17 forms a voltage follower. Col. 4, lines 64 to 68. Referring to the configuration of Figure 8, relied upon by the Examiner in support of the present rejection, Tsukada et al. discloses that one circuit 17 is provided for each of two ion selective membranes 29 and 30, and reference electrode 31 is connected to the ground terminal 15, which serves as a ground terminal of the buffer amplifier of each sensor circuit 17. Col. 8, lines 51-62. The amplified "output signal, i.e., sensor detection signal from each of the sensor circuits 17 is transmitted to an external measurement circuit through lead wires connected to respective output terminals 37, 38 to thereby calculate the concentrations of Na ions and K ions in a solution to be measured." Col. 9, lines 4 to 9 (emphasis added). Thus, although circuitry 17 may amplify and/or buffer a voltage received from membranes 29 and 30, any measurement or evaluation would occur at an external measurement circuit.

As such, even assuming, *arguendo*, that the rationale in support of the proposed combination of Horie '137, Horie '596, and Tsukada et al. is proper—which Applicants do not concede—the proposed resulting device would, at most, result in an oil sensor having electrodes disposed on a substrate with a signal *processing* circuit to amplify and/or buffer an output signal to be measured or evaluated by an *external measurement circuit* to determine any properties or characteristics of the oil. In plain contrast, claim 1 recites an *evaluation circuit disposed on the substrate* and in communication with the electrodes, the evaluation circuit *configured to detect a degradation process of a motor oil based on the potentiometric response of the two electrodes*. It is plainly apparent that the proposed combination of Horie '137, Horie '596, and Tsukada et al. does not disclose, or even suggest, this feature.

The Examiner argues in the Advisory Action, however, that the components disclosed by Tsukada et al. are analogous to the configuration disclosed in Appellants' specification, in that they are each connected to an externally located control system. Based on this alleged similarity, the Examiner concludes that the arrangement of Tsukada discloses the same features as claimed in claim 1. Claim 1, however, plainly recites that the evaluation circuit, which is disposed on the substrate, is configured to detect a degradation process of a motor oil based on the potentiometric response of the two electrodes. As best understood by Appellants, the Examiner is contending in the Advisory Action that since the Appellants' sensor device is disclosed in the specification as communicating with a control system of an automobile, the control system must perform the evaluation rather than the sensor device. However, there is no basis for this conclusion, since the specification and the plain language of claim 1 make clear that it is the evaluation circuit that performs the evaluation.

Further, the Examiner contends that “[t]here is nothing in the specification or claims that states that this evaluation must take particular forms” and that “[a]bsent an explicit recitation of an evaluation function that is not provided by the circuitry of Tsukada, this argument that Tsukada does not provide an evaluation circuit is unpersuasive.” To the contrary, claim 1 plainly recites that the evaluation circuit is configured to detect a degradation process of a motor oil based on the potentiometric response of the two electrodes. The circuitry of Tsukada et al. is not in any way disclosed as being configured to detect a degradation process of a motor oil based on the potentiometric response of the two electrodes.

Moreover, the Examiner contends that “Tsukada teaches that one could *relocate* the already specified circuitry of Horie '596 to the same substrate as the electrode.”

However, this is not what Tsukada teaches. As indicated above, Tsukada et al. teaches that a signal amplification arrangement may be located on the substrate and a measurement circuit is located separate from the substrate. Tsukada et al. contains no teaching whatsoever of *relocating* any measurement or evaluation circuitry to the substrate. To the contrary, Tsukada et al. teaches that the measurement circuitry of the control system is kept separate from the sensor substrate, as more fully set forth above. Thus, the Examiner's position that Tsukada et al. teaches one of ordinary skill in the art to relocate any measurement circuitry of Horie '596 onto a sensor substrate with measurement electrodes is plainly untenable.

As indicated above, the combination of Horie '137, Horie '596, and Tsukada et al. does not disclose, or even suggest, all of the features of claim 1. Thus, the combination of Horie '137, Horie '596, and Tsukada et al. does not render unpatentable claim 1 or either of claims 2 and 3, which depend from claim 1. Accordingly, withdrawal of this rejection is respectfully requested.

In view of the foregoing, it is plainly apparent that the combination of Horie '137, Horie '596, and Tsukada et al. fails to disclose, or even suggest, all of the features set forth in claim 1. Accordingly, it is plainly apparent that the combination of Horie '137, Horie '596, and Tsukada et al. fails to render unpatentable claim 1. That is, the Final Office Action does not establish a *prima facie* case of obviousness—as it must—consistent with the Supreme Court's decision in *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398, 82 U.S.P.Q.2d 1385 (2007).

Claims 2 and 3 depend from claim 1. As such, it is respectfully submitted that the combination of Horie '137, Horie '596, and Tsukada et al. also fails to render unpatentable claims 2 and 3. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988) (any dependent claim that depends from a non-obvious independent claim is non-obvious).

In view of all of the foregoing, reversal of the present rejection is respectfully requested.

**B. Rejection of Claims 4 to 6 Under 35 U.S.C. § 103(a)**

Claims 4 to 6 stand rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Horie '137, Horie '596, Tsukada et al., and Tani et al. It is respectfully submitted that the present rejection should be reversed for at least the following reasons.

Claims 4 to 6 depend from claim 1. As more fully set forth above, the combination of Horie '137, Horie '596, and Tsukada et al. does not render unpatentable claim 1. Tani et al. does not cure the critical deficiencies of the combination of Horie '137, Horie

'596, and Tsukada et al. As such, it is respectfully submitted that the combination of Horie '137, Horie '596, Tsukada et al., and Tani et al. does not render unpatentable claims 4 to 6, which depend from claim 1. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988) (any dependent claim that depends from a non-obvious independent claim is non-obvious).

In view of all of the foregoing, reversal of this rejection is respectfully requested.

**C. Rejection of Claims 7 and 8 Under 35 U.S.C. § 103(a)**

Claims 7 and 8 stand rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Horie '137, Horie '596, Tsukada et al., Tani et al., Kato et al., and Carter et al. It is respectfully submitted that the present rejection should be reversed for at least the following reasons.

Claims 7 and 8 depend from claim 1. As more fully set forth above, the combination of Horie '137, Horie '596, Tsukada et al., and Tani et al. does not render unpatentable claim 1. Kato et al. and Carter et al., alone or in combination, do not cure the critical deficiencies of the combination of Horie '137, Horie '596, Tsukada et al., and Tani et al. As such, it is respectfully submitted that the combination of Horie '137, Horie '596, Tsukada et al., Tani et al., Kato et al., and Carter et al. does not render unpatentable claims 7 and 8, which depend from claim 1. *Id.*

In view of all of the foregoing, reversal of this rejection is respectfully requested.

**D. Rejection of Claims 9 to 13 Under 35 U.S.C. § 103(a)**

Claims 9 to 13 stand rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Horie '137, Horie '596, Tsukada et al., and Radford et al. It is respectfully submitted that the present rejection should be reversed for at least the following reasons.

Claims 9 to 13 depend from claim 1. As more fully set forth above, the combination of Horie '137, Horie '596, and Tsukada et al. does not render unpatentable claim 1. Radford et al. does not cure the critical deficiencies of the combination of Horie '137, Horie '596, and Tsukada et al. As such, it is respectfully submitted that the combination of Horie '137, Horie '596, Tsukada et al., and Radford et al. does not render unpatentable claims 9 to 13, which depend from claim 1. *Id.*

In view of all of the foregoing, reversal of this rejection is respectfully requested.

**E. Rejection of Claims 14 to 19 Under 35 U.S.C. § 103(a)**

Claims 14 to 19 stand rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Horie '137, Horie '596, Tsukada et al., Tani et al., Ushizawa et al., and Hobbs et al. It is respectfully submitted that the present rejection should be reversed for at least the following reasons.

Claims 14 to 19 depend from claim 1. As more fully set forth above, the combination of Horie '137, Horie '596, Tsukada et al., and Tani et al. does not render unpatentable claim 1. Ushizawa et al. and Hobbs et al., alone or in combination, do not cure the critical deficiencies of the combination of Horie '137, Horie '596, Tsukada et al., and Tani et al. As such, it is respectfully submitted that the combination of Horie '137, Horie '596, Tsukada et al., Tani et al., Ushizawa et al., and Hobbs et al. does not render unpatentable claims 14 to 19, which depend from claim 1. *Id.*

In view of all of the foregoing, reversal of this rejection is respectfully requested.

**F. Rejection of Claim 20 Under 35 U.S.C. § 103(a)**

Claim 20 stands rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Horie '137, Horie '596, Tsukada et al., and Hornberger. It is respectfully submitted that the present rejection should be reversed for at least the following reasons.

Claim 20 depends from claim 1. As more fully set forth above, the combination of Horie '137, Horie '596, and Tsukada et al. does not render unpatentable claim 1. Hornberger does not cure the critical deficiencies of the combination of Horie '137, Horie '596, and Tsukada et al. As such, it is respectfully submitted that the combination of Horie '137, Horie '596, Tsukada et al., and Hornberger does not render unpatentable claim 11, which depends from claim 1. *Id.*

In view of all of the foregoing, reversal of this rejection is respectfully requested.

**8. CLAIMS APPENDIX**

A "Claims Appendix" is attached hereto and appears on the three (3) pages numbered "Claims Appendix 1" to "Claims Appendix 3."



**9. EVIDENCE APPENDIX**

No evidence has been submitted pursuant to 37 C.F.R. §§ 1.130, 1.131 or 1.132. No other evidence has been entered by the Examiner or relied upon by Appellants in the appeal. An “Evidence Appendix” is nevertheless attached hereto and appears on the one (1) page entitled “Evidence Appendix.”

**10. RELATED PROCEEDINGS APPENDIX**

As indicated above in Section 2, above, “[t]here are no other prior or pending appeals, interferences or judicial proceedings known by the undersigned, or believed by the undersigned to be known to Appellants or the assignee, ROBERT BOSCH GMBH, ‘which may be related to, directly affect or be directly affected by or have a bearing on the Board’s decision in the pending appeal.’” As such, there no “decisions rendered by a court or the Board in any proceeding identified pursuant to [37 C.F.R. § 41.37(c)(1)(ii)]” to be submitted. A “Related Proceedings Appendix” is nevertheless attached hereto and appears on the one (1) page entitled “Related Proceedings Appendix.”

**11. CONCLUSION**

For at least the reasons indicated above, Appellants respectfully submit that the art of record does not disclose or suggest the subject matter as recited in the claims of the above-identified application. Accordingly, it is respectfully submitted that the subject matter as set forth in the claims of the present application is patentable.

In view of all of the foregoing, reversal of all of the rejections set forth in the Final Office Action is therefore respectfully requested.

Respectfully submitted,

/Clifford A. Ulrich/

Dated: July 8, 2010

By: Clifford A. Ulrich, Reg. No. 42,194 for:  
Gerard A. Messina, Reg. No. 35,952

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## **CLAIMS APPENDIX**

1. A potentiometric sensor device for measuring pH value, comprising:  
a substrate;  
two electrodes positioned on the substrate, wherein the two electrodes are applied with the aid of thick film technology, and wherein the two electrodes form an interdigital comb structure; and  
an evaluation circuit disposed on the substrate and in communication with the electrodes, the evaluation circuit configured to detect a degradation process of a motor oil based on the potentiometric response of the two electrodes.
2. The potentiometric sensor device as recited in claim 1, wherein, in the region of the interdigital comb structure, the two electrodes have a spacing between 0.1  $\mu\text{m}$  and 1000  $\mu\text{m}$ .
3. The potentiometric sensor device as recited in claim 2, wherein the spacing between the two electrodes in the region of the interdigital comb structure is between 160  $\mu\text{m}$  to 200  $\mu\text{m}$ .
4. The potentiometric sensor device as recited in claim 3, wherein the substrate is made of a glass ceramic foil having a low electrical conductivity and a high mechanical strength.
5. The potentiometric sensor device as recited in claim 4, wherein the substrate is made of a low temperature sintering glass ceramic that cures at a temperature under 1000°C.
6. The potentiometric sensor device as recited in claim 5, wherein the two electrodes are made of at least one of metals and metallic oxides.
7. The potentiometric sensor device as recited in claim 6, wherein the two electrodes are made of at least one of silver and iridium dioxide.
8. The potentiometric sensor device as recited in claim 7, wherein at least one electrode is made of silver and has a silver halogenide layer on its surface in the region of the interdigital comb structure.

9. The potentiometric sensor device as recited in claim 1, wherein the two electrodes are applied to the substrate in the form of pastes, and wherein, in order to improve adhesion between the two electrodes and the substrate, the pastes include an inorganic material between approximately 0.2 mass% to 20 mass%.

10. The potentiometric sensor device as recited in claim 9, wherein the pastes include an inorganic material between approximately 10 mass% to 15 mass%.

11. The potentiometric sensor device as recited in claim 10, wherein the inorganic material corresponds to the substrate material.

12. The potentiometric sensor device as recited in claim 10, wherein the pastes are made of a powder mixture of electrode material and inorganic material, and a carrier material, the proportion of the powder mixture in the paste being between approximately 10 mass% and 70 mass%.

13. The potentiometric sensor device as recited in claim 11, wherein the pastes are made of a powder mixture of electrode material and inorganic material, and a carrier material, the proportion of the powder mixture in the paste being between approximately 10 mass% and 70 mass%.

14. The potentiometric sensor device as recited in claim 1, wherein a hydrous layer made of a hydrous polymer is provided on the two electrodes.

15. The potentiometric sensor device as recited in claim 14, wherein the hydrous polymer is one of a polyamide and a polyimide.

16. The potentiometric sensor device as recited in claim 3, wherein a hydrous layer made of a hydrous polymer is provided on the two electrodes.

17. The potentiometric sensor device as recited in claim 16, wherein the hydrous polymer is one of a polyamide and a polyimide.

18. The potentiometric sensor device as recited in claim 4, wherein a hydrous layer made of a hydrous polymer is provided on the two electrodes.

19. The potentiometric sensor device as recited in claim 18, wherein the hydrous polymer is one of a polyamide and a polyimide.

20. The potentiometric sensor device as recited in claim 1, wherein the evaluation circuit is further configured to normalize a measurement in response to different operating states of the motor oil.

### **EVIDENCE APPENDIX**

No evidence has been submitted pursuant to 37 C.F.R. §§1.130, 1.131, or 1.132. No other evidence has been entered by the Examiner or relied upon by Appellants in the appeal.

### **RELATED PROCEEDINGS APPENDIX**

As indicated above in Section 2 of this Appeal Brief, “[t]here are no other prior or pending appeals, interferences or judicial proceedings known by the undersigned, or believed by the undersigned to be known to Appellants or the assignee, ROBERT BOSCH GMBH, ‘which may be related to, directly affect or be directly affected by or have a bearing on the Board’s decision in the pending appeal.’” As such, there are no “decisions rendered by a court or the Board in any proceeding identified pursuant to [37 C.F.R. § 41.37(c)(1)(ii)]” to be submitted.